

FUNCTIONAL RESISTANCE IN FIRE EXPERT JUDGEMENT REPORT WITH CLASSIFICATION FIRES-JR-088-24-NURE

**Cable supporting system NIEDAX with halogen-free power
and communication cables Bitner**

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FUNCTIONAL RESISTANCE IN FIRE EXPERT JUDGEMENT REPORT WITH CLASSIFICATION IN ACCORDANCE WITH DIN 4102-12: 1998-11

FIRES-JR-088-24-NURE

Name of the product: Cable supporting system NIEDAX with halogen-free power and communication cables Bitner

Sponsor: Niedax GmbH & Co. KG
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1. INTRODUCTION

This expert judgement report with classification defines the function in fire classification assigned to element „Cable supporting system NIEDAX with halogen-free power and communication cables Bitner” in accordance with the classes given in DIN 4102-12: 1998-11.

The test was carried out according to standard STN 92 0205 and meets requirements of DIN 4102-12: 1998-11. The basic difference between these standards lies in the measurement and control of the temperature in the test furnace. According to STN 92 0205, plate thermometers in accordance with EN 1363-1 are used. According to DIN 4102-12: 1998-11, common thermocouples are used; thermocouples with this design were used for this measurement until the issue of EN 1363-1. Measurement with plate thermometers to EN 1363-1 represents a stricter method of temperature control in the test furnace compared to thermocouples used before publication of EN 1363-1. Therefore, it is possible to use the results of a test according to STN 92 0205 for classification of tested cables according to DIN 4102-12: 1998-11, but not conversely. Different results identified in consequence of stricter test conditions can lead to reduced classification of tested cables what is accepted as enhanced security in practice.

This expert judgement report defines field of application which is outside the field of direct application according test standard. This expert judgement expresses the opinion of the FIRES and is based on the experience or internal rules of FIRES.

This product has already been classified by FIRES, s.r.o. and number of previous fire resistance expert judgement report with classification is FIRES-JR-007-19-NURE (issued on 23. 01. 2019) with validity until 23. 01. 2024. Document FIRES-JR-088-24-NURE replaces expert judgement report with classification FIRES-JR-007-19-NURE.

2. DETAILS OF CLASSIFIED PRODUCT

2.1 GENERAL

The element, Cable supporting system NIEDAX with halogen-free power and communication cables Bitner, is defined as a cable supporting system for power and communication halogen free cables with circuit integrity maintenance.

2.2 PRODUCT DESCRIPTION

Product comprised of cable supporting system NIEDAX (cable trays, mesh trays, ladders with accessories) with halogen-free power and communication cables Bitner.

Cable supporting system of Niedax:

Cable tray RLVC 60

Cable tray is made of steel sheet thickness 0,75 mm, 0,8 mm or 0,9 mm thick. Height of side wall is 60 mm and maximum tested width is 400 mm. Trays are fixed together by integrated plug-in connectors and nut bolts (FLM 6x12) or alternatively by connectors RVV50 with nut bolts. Maximum tested loading is 20kg.m⁻¹. Tested cable trays are RLVC 60.300 and RLVC 60.400.

Cable tray RL 110

Cable tray is made of steel sheet thickness 0,8 mm, 0,9 mm or 1,0 mm thick. Height of side wall is 110 mm and maximum tested width is 400 mm. Trays are fixed together by connectors (RV 110.400) with nut bolts (FLM 6x12). Maximum tested loading is 20kg.m⁻¹. Tested cable tray is RL 110.400.

Cable mesh tray MTC 54

Cable mesh tray is made of longitudinal steel wires either \varnothing 3,9 mm or \varnothing 4,8 mm and transverse steel wires \varnothing 3,9 mm, \varnothing 4,8 mm or \varnothing 5,8 mm. Height of side wall is 54,0 mm and maximum tested width of cable mesh tray is 400 mm. Mesh trays are fixed together by integrated plug-in connectors or alternatively by nut bolts GRHKM 6x15. Maximum tested loading is 15kg.m⁻¹. Tested mesh tray is MTC 54.400.

**Cable ladder STL 60**

Cable ladder is made of steel sheet thickness 1,5 mm and spacing of transoms is 300 mm. Cross-section dimensions of transoms are (30 x 15 x 1,5) mm. Height of side wall is 60 mm and maximum tested width of cable ladder is 400 mm. Cable ladders are fixed together by two side connectors (KLVB 60/4) with nut bolts (FLM8x13, 4 pcs per connector). Maximum tested loading is 20kg.m⁻¹. Tested ladder is STL 60.403.

C-profile 2970

Profile with dimensions (30 x 15) mm is made of bent steel sheet 1,5 mm thick. Profile is used for fixing of cables to ceiling and wall by cable clips.

C-profile 2987

Profile with dimensions (48 x 22) mm is made of bent steel sheet 1,75 mm thick. Profile is used for suspension of trays and ladders.

C-profile 2986

Profile with dimensions (40 x 22) mm is made of bent steel sheet 2,0 mm thick. Profile is used for suspension of trays and ladders.

Console HU 5050

Console consists of base plate with dimensions (140 x 80 x 5) mm and support with dimensions (50 x 50 x 2,5) mm. Console is used for gripping of brackets to ceiling.

Bracket KTA and KTAG

Bracket consists of two parts – base plate (from 4,0 to 6,0 mm thick) and bent steel sheet (from 1,5 to 2,0 mm thick) welded together. Brackets are used for fixation of trays and ladders.

Support TAH

Support consists of two parts and is made of bent steel sheet 4,0 mm thick and 30 mm wide. Support is used for suspension of trays and ladders.

Trapezoidal hanger DBT 40

Hanger is made of bent steel sheet 1,5 mm thick.

Spacer HDS

Spacer is made of bent steel sheet 1,5 mm thick with dimensions (80 x 43) mm. Spacers are used for reinforcement of consoles at place of brackets fixation.

Suspension hanger DBG

Hanger consists of two part made of bent steel sheet with dimensions (58 x 54 x 4) mm. Hanger is used for fixation of threaded rod to ceiling or wall.

Cable clip SAS

Cable clip consists of two parts made of bent steel sheet from 1,2 to 2,0 mm thick and is used for fixation of cables to ceiling or wall.

Cable clamps “B”

Cable clamp consists of two parts made of bent steel sheet from 1,5 to 2,0 mm thick and is used for fixation of cables to ceiling or wall.

All parts of cable supporting systems are made of galvanized steel according to EN ISO 1461.

Steel chains were used for additional loading of tracks.

Cables

Halogen-free cables are used for applications in public buildings, where fire would present a significant hazard to human life as a result of emission of toxic gasses and dense smoke hampering the evacuation or when the losses caused by the corrosive acid gasses would be higher than other damage caused by fire.

**Cables used by test:**Power cables:

BiTflame®1000 FE180/PH90/E90 0,6/1kV
BiTflame®1000C FE180/PH90/E90 0,6/1kV
NHXH FE180/E90 0,6/1kV
NHXCH FE180/E90 0,6/1kV
(N)HXH FE180/E90 0,6/1kV
(N)HXCH FE180/E90 0,6/1kV

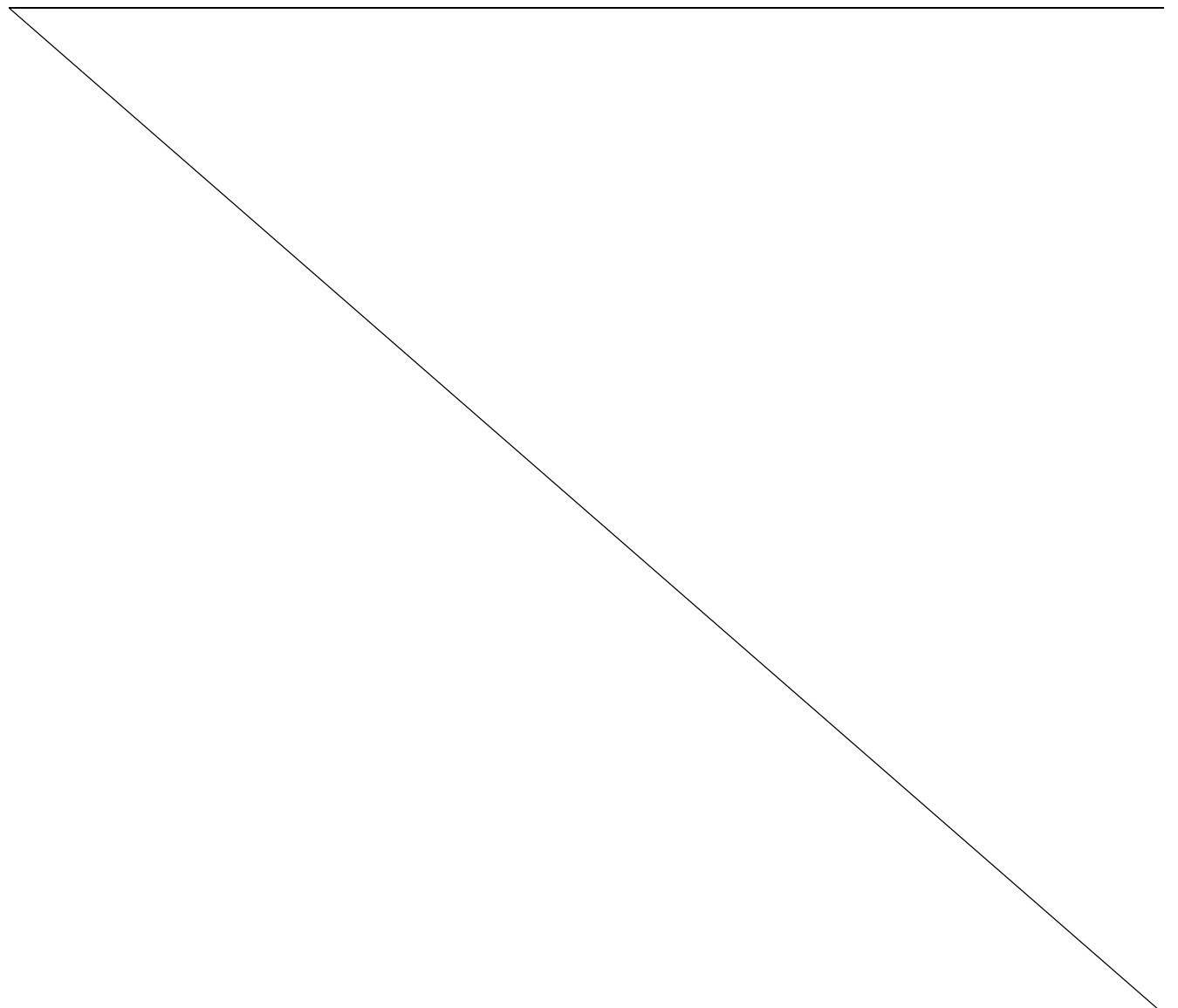
Communication cables:

HTKSH FE180/PH90/E90 225V
HTKSHekw FE180/PH90/E90 225V
HDGs FE180/PH90/E90 300/500V
HDGsekwf FE180/PH90/E90 300/500V

The length of cables was 5,2 m and 4,0 m from that was exposed to fire.

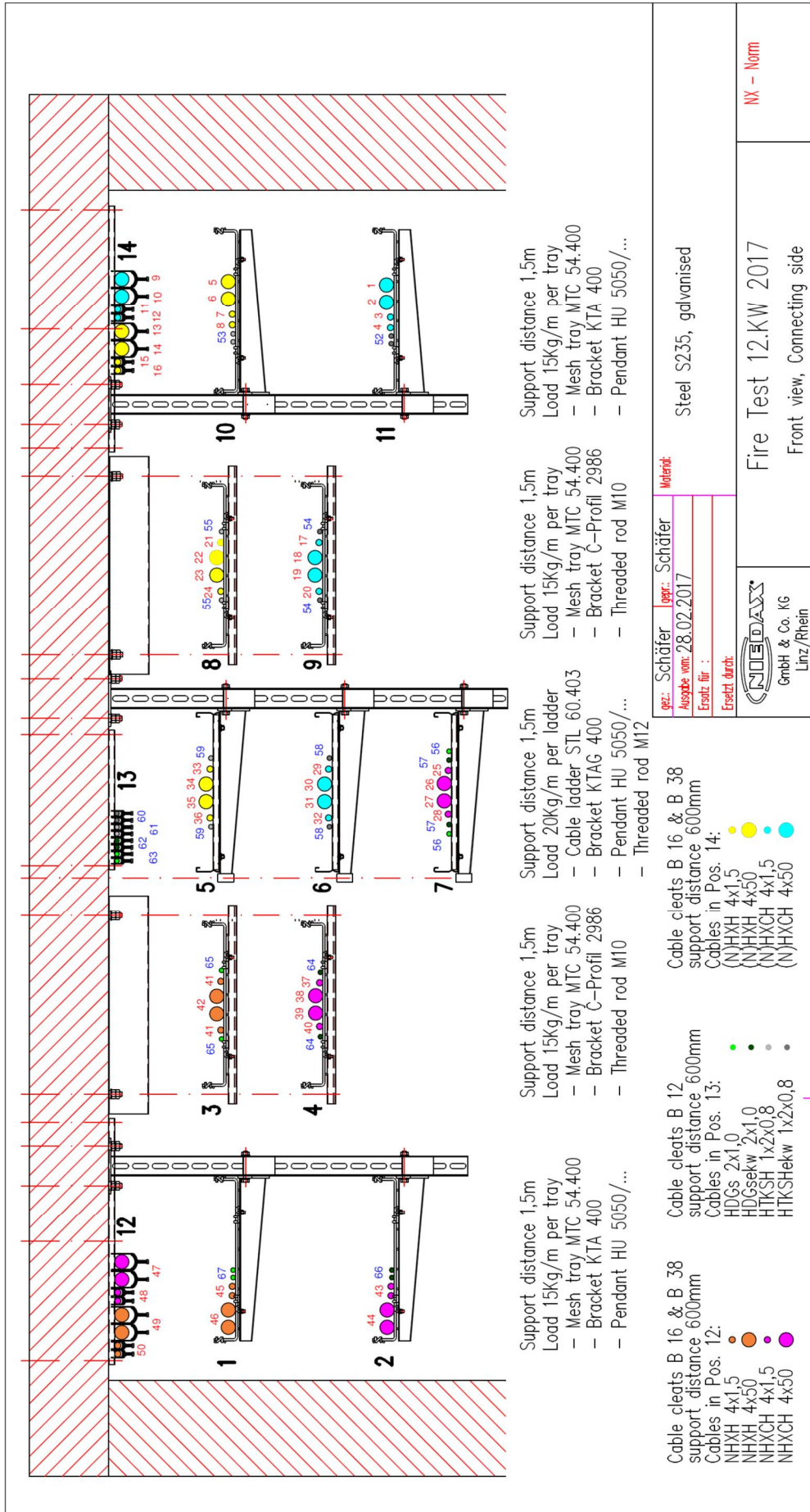
Cable penetration through the wall of test furnace was sealed by mineral wool and sprayed insulation material Tecwool.

More detailed information about product construction is shown in the drawings which form an integral part of test report [1] according to chapter 3.1 of this document.



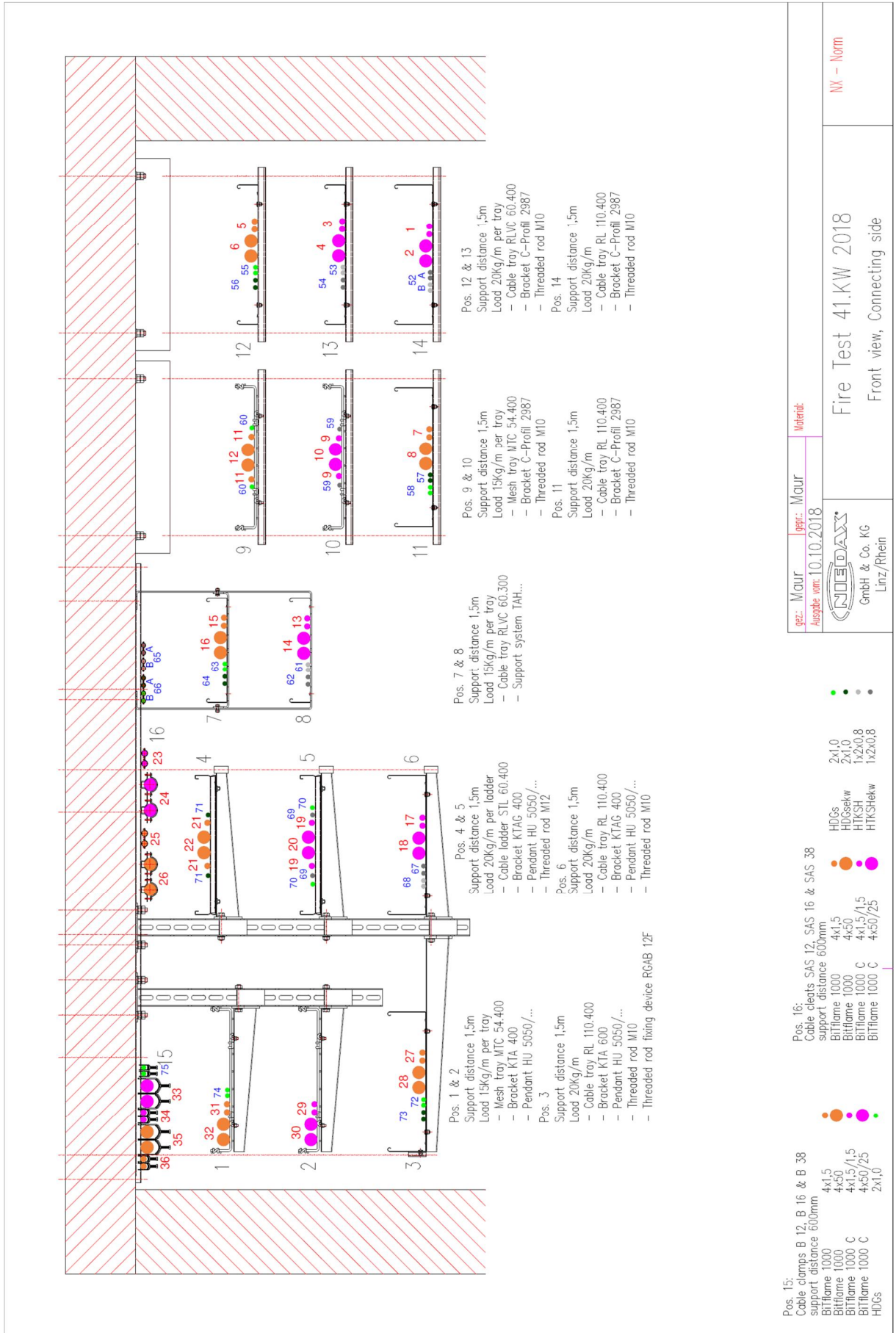


Constructions tested by test [1]:





Constructions tested by test [2]:





3. TEST REPORTS AND EXTENDED APPLICATION REPORTS IN SUPPORT OF CLASSIFICATION

3.1 TEST REPORTS AND EXTENDED APPLICATION REPORTS

No.	Name of laboratory	Name of sponsor	Test report No.	Date of the test	Test method
[1]	FIRES, s.r.o., Batizovce, SR	Niedax GmbH & Co. KG, Linz am Rhein, DE	FIRES-FR-026-17-AUNE	23. 03. 2017	STN 92 0205
[2]			FIRES-FR-222-18-AUNE	11. 10. 2018	

Note: The test was carried out according previous version of test standard. Current version of test standard is: STN 92 0205: 2014/Z1: 2019. Change of the standard does not have influence on the test results summarized in the test report.

3.2 TEST RESULTS

No./ Test method	Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
[1] STN 92 0205: 2014	1	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV	11	82 minutes
	2	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		74 minutes
	3	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		53 minutes
	4	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		51 minutes
	5	cable (N)HXH FE180/E90 4x50RM 0,6/1kV	10	90 minutes no failure / interruption
	6	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	7	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		67 minutes
	8	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		65 minutes
	9	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV	14	88 minutes
	10	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		85 minutes
	11	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption
	12	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		74 minutes
	13	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	14	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		41 minutes
	15	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		74 minutes
	16	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		79 minutes
	17	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV	9	69 minutes
	18	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		73 minutes
	19	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		79 minutes
	20	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		69 minutes
	21	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV	8	78 minutes
	22	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	23	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	24	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		90 minutes no failure / interruption
	25	cable NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV	7	90 minutes no failure / interruption
	26	cable NHXCH FE180/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	27	cable NHXCH FE180/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	28	cable NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption
	29	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV	6	90 minutes no failure / interruption
	30	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	31	cable (N)HXCH FE180/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	32	cable (N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption



No./ Test method	Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
[1] STN 92 0205: 2014	33	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV	5	90 minutes no failure / interruption
	34	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	35	cable (N)HXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	36	cable (N)HXH FE180/E90 4x1,5RE 0,6/1kV		33 minutes
	37	cable NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV	4	90 minutes no failure / interruption
	38	cable NHXCH FE180/E90 4x50RM/25 0,6/1kV		85 minutes
	39	cable NHXCH FE180/E90 4x50RM/25 0,6/1kV		88 minutes
	40	cable NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption
	41	2 cables NHXH FE180/E90 4x1,5RE 0,6/1kV	3	90 minutes no failure / interruption
	42	2 cables NHXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	43	2 cables NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV	2	90 minutes no failure / interruption
	44	2 cables NHXCH FE180/E90 4x50RM/25 0,6/1kV		84 minutes
	45	2 cables NHXH FE180/E90 4x1,5RE 0,6/1kV	1	37 minutes
	46	2 cables NHXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	47	2 cables NHXCH FE180/E90 4x50RM/25 0,6/1kV	12	90 minutes no failure / interruption
	48	2 cables NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption
	49	2 cables NHXH FE180/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	50	2 cables NHXH FE180/E90 4x1,5RE 0,6/1kV		90 minutes no failure / interruption
	52	2 cables HTKSHekw 1x2x0,8 FE180 PH90/E90 225V	11	90 minutes no failure / interruption
	53	2 cables HTKSH 1x2x0,8 FE180 PH90/E90 225V	10	90 minutes no failure / interruption
	54	2 cables HTKSHekw 1x2x0,8 FE180 PH90/E90 225V	9	51 minutes
	55	2 cables HTKSH 1x2x0,8 FE180 PH90/E90 225V	8	90 minutes no failure / interruption
	56	2 cables HDGs 2x1,0 FE180 PH90/E90 300/500V	7	90 minutes no failure / interruption
	57	2 cables HDGsekwf 2x1,0 FE180 PH90/E90 300/500V		29 minutes
	58	2 cables HTKSHekw 1x2x0,8 FE180 PH90/E90 225V	6	47 minutes
	59	2 cables HTKSH 1x2x0,8 FE180 PH90/E90 225V	5	90 minutes no failure / interruption
	60	2 cables HTKSHekw 1x2x0,8 FE180 PH90/E90 225V	13	90 minutes no failure / interruption
	61	2 cables HTKSH 1x2x0,8 FE180 PH90/E90 225V		90 minutes no failure / interruption
	62	2 cables HDGsekwf 2x1,0 FE180 PH90/E90 300/500V		90 minutes no failure / interruption
	63	2 cables HDGs 2x1,0 FE180 PH90/E90 300/500V		87 minutes
64	2 cables HDGsekwf 2x1,0 FE180 PH90/E90 300/500V	4	90 minutes no failure / interruption	
65	2 cables HDGs 2x1,0 FE180 PH90/E90 300/500V	3	90 minutes no failure / interruption	
66	2 cables HDGsekwf 2x1,0 FE180 PH90/E90 300/500V	2	90 minutes no failure / interruption	
67	2 cables HDGs 2x1,0 FE180 PH90/E90 300/500V	1	90 minutes no failure / interruption	
[2] STN 92 0205: 2014	1	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	14	90 minutes no failure / interruption
	2	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	3	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	13	90 minutes no failure / interruption
	4	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption
	5	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	12	90 minutes no failure / interruption
	6	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	7	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	11	58 minutes
	8	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption
	9	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	10	90 minutes no failure / interruption
	10	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption



No./ Test method	Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor	
[2] STN 92 0205: 2014	11	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	9	90 minutes no failure / interruption	
	12	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption	
	13	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	8	90 minutes no failure / interruption	
	14	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption	
	15	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	7	90 minutes no failure / interruption	
	16	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption	
	17	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	6	77 minutes	
	18	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption	
	19	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	5	90 minutes no failure / interruption	
	20	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		64 minutes	
	21	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	4	90 minutes no failure / interruption	
	22	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption	
	23	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	16	90 minutes no failure / interruption	
	24	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption	
	25	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV		90 minutes no failure / interruption	
	26	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption	
	27	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	3	53 minutes	
	28	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption	
	29	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV	2	90 minutes no failure / interruption	
	30	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV		90 minutes no failure / interruption	
	31	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV	1	90 minutes no failure / interruption	
	32	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption	
	33	2 cables BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV	15	90 minutes no failure / interruption	
	34	2 cables BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV		90 minutes no failure / interruption	
	35	2 cables BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV		90 minutes no failure / interruption	
	36	2 cables BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV		90 minutes no failure / interruption	
	52	A	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	14	90 minutes no failure / interruption
		B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption
	53	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	13	90 minutes no failure / interruption	
	54	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption	
	55	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	12	84 minutes	
	56	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption	
	57	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	11	90 minutes no failure / interruption	
	58	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption	
	59	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	10	90 minutes no failure / interruption	
	60	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	9	90 minutes no failure / interruption	
61	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V	8	90 minutes no failure / interruption		
62	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption		
63	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	7	41 minutes		
64	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption		
65	A	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	16	90 minutes no failure / interruption	
	B	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		90 minutes no failure / interruption	
66	A	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption	
	B	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		90 minutes no failure / interruption	
67	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	6	55 minutes		
68	2 cables HTKSH 1x2x0,8 FE180/PH90/E90 225V		46 minutes		

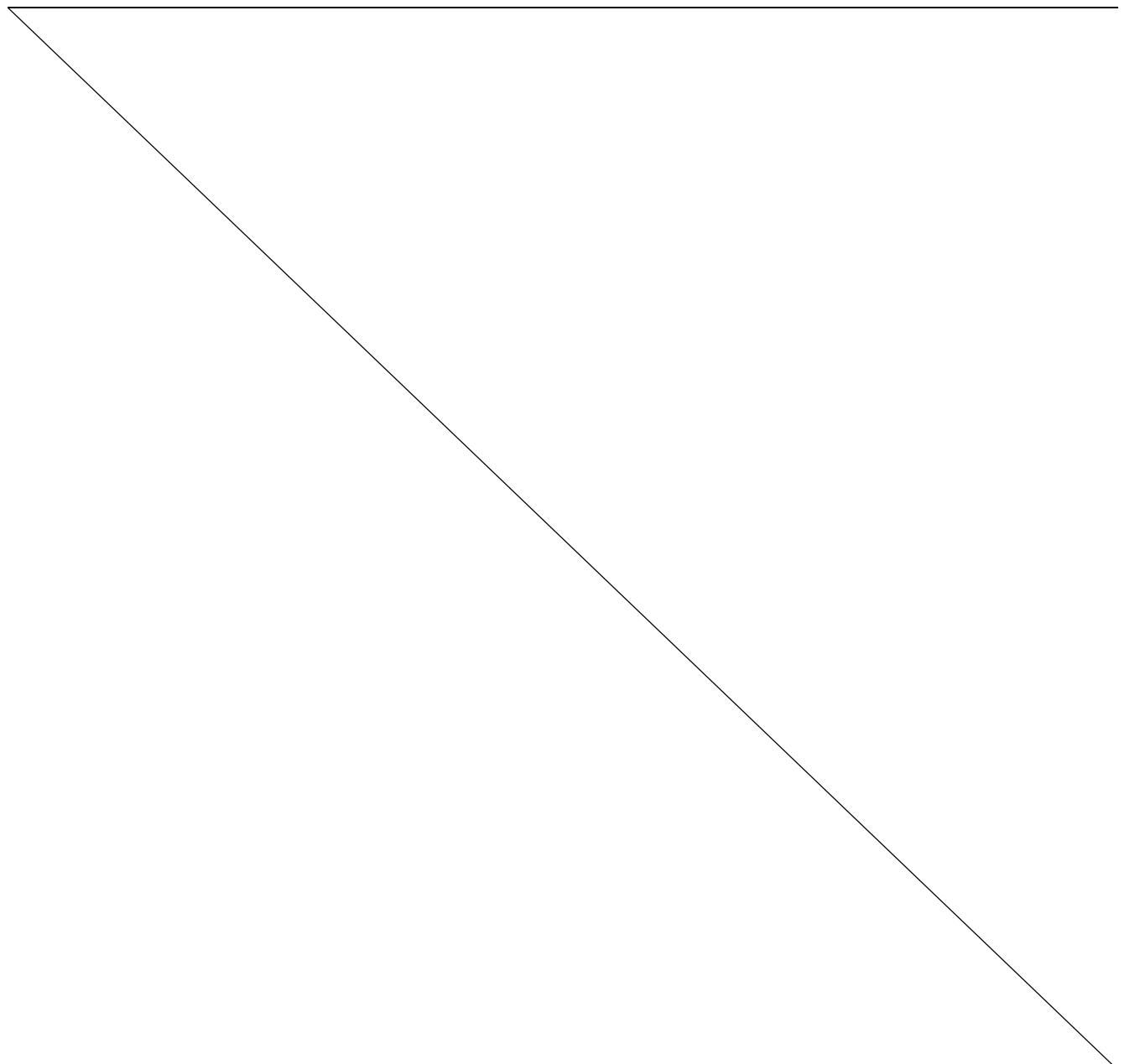


No./ Test method	Specimen No.	Cables	Track No.	Time to first failure / interruption of conductor
[2] STN 92 0205: 2014	69	2 cables HTKSHekw 1x2x0,8 FE180/PH90/E90 225V	5	90 minutes no failure / interruption
	70	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V		60 minutes
	71	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V	4	90 minutes no failure / interruption
	72	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	3	33 minutes
	73	2 cables HDGsekwf 2x1,0 FE180/PH90/E90 300/500V		74 minutes
	74	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	1	50 minutes
	75	2 cables HDGs 2x1,0 FE180/PH90/E90 300/500V	15	90 minutes no failure / interruption

[1], [2] The tests were discontinued in 94th minute upon request of the test sponsor

Specimens S1 – S51 were tested by three-phase voltage supply 3 x 230/400V with bulbs 240V / 60 W.
 Specimens S52 – S75 were tested by one-phase voltage supply 1 x 110V with LED diodes 3V /0,03W.

Circuit breakers with rating 3 A were used.





4. CLASSIFICATION AND FIELD OF APPLICATION

4.1 CLASSIFICATION ACCORDING TO DIN 4102-12: 1998-11

The element, **Cable supporting system NIEDAX with halogen-free power and communication cables Bitner**, is classified according to the following combinations of performance parameters and classes as appropriate.

Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections)	Classification for cable
NHXH FE180/E90 0,6/1kV	NHXH FE180/E90 4x1,5RE 0,6/1kV [1]	Cable mesh tray MTC 54.400. Consoles HU 5050, brackets KTA 400 and spacer HDS 5050. Consoles in spacing of 1500 mm. Maximum loading 15kg.m ⁻¹ . Suspended installation. Non-standard tracks: No. 1, 2 and 10, 11 [1]. No. 1 and 2 [2].	E 30	n x ≥1,5 mm ² n ≥ 1
	NHXH FE180/E90 4x50RM 0,6/1kV [1]		E 90	E 30
NHXCH FE180/E90 0,6/1kV	NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		E 90	n x ≥1,5 mm ² n ≥ 1
	NHXCH FE180/E90 4x50RM/25 0,6/1kV [1]		E 60	E 60
(N)HXH FE180/E90 0,6/1kV	(N)HXH FE180/E90 4x1,5RE 0,6/1kV [1]		E 60	n x ≥1,5 mm ² n ≥ 1
	(N)HXH FE180/E90 4x50RM 0,6/1kV [1]		E 90	E 60
(N)HXCH FE180/E90 0,6/1kV	(N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		E 30	n x ≥1,5 mm ² n ≥ 1
	(N)HXCH FE180/E90 4x50RM/25 0,6/1kV [1]		E 60	E 30
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]		E 90	n x ≥1,5 mm ² n ≥ 1
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		E 90	E 90
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]		E 90	n x ≥1,5 mm ² n ≥ 1
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		E 90	E 90
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [1]		E 90	n x ≥1,0 mm ² n ≥ 2 E 90
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [1]		E 90	n x ≥1,0 mm ² n ≥ 2 E 90
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [1]	E 90	n x 2 x ≥0,8 mm n ≥ 1 E 90	
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [1]	E 90	n x 2 x ≥0,8 mm n ≥ 1 E 90	



Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections)	Classification for cable	
NHXH FE180/E90 0,6/1kV	NHXH FE180/E90 4x1,5RE 0,6/1kV [1]	Cable mesh tray MTC 54.400. Consoles combined of C-profile 2986 and threaded rods M10. Consoles suspended to supporting construction ¹⁾ by trapezoidal hangers DBT40 and threaded rods M8. Consoles in spacing of 1500 mm. Maximum loading 15kg.m ⁻¹ . Suspended installation. Non-standard tracks: No. 3, 4 and 8, 9 [1]	E 90	n x ≥1,5 mm ² n ≥ 1	
	NHXH FE180/E90 4x50RM 0,6/1kV [1]		E 90	E 90	
NHXCH FE180/E90 0,6/1kV	NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		E 90	n x ≥1,5 mm ² n ≥ 1	
	NHXCH FE180/E90 4x50RM/25 0,6/1kV [1]		E 60	E 60	
(N)HXH FE180/E90 0,6/1kV	(N)HXH FE180/E90 4x1,5RE 0,6/1kV [1]		E 60	n x ≥1,5 mm ² n ≥ 1	
	(N)HXH FE180/E90 4x50RM 0,6/1kV [1]		E 90	E 60	
(N)HXCH FE180/E90 0,6/1kV	(N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		E 60	n x ≥1,5 mm ² n ≥ 1	
	(N)HXCH FE180/E90 4x50RM/25 0,6/1kV [1]		E 60	E 60	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [1]		E 90	n x ≥1,0 mm ² n ≥ 2	
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [1]		E 90	n x ≥1,0 mm ² n ≥ 2	
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [1]		E 90	n x 2 x ≥0,8 mm n ≥ 1	
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [1]		E 30	n x 2 x ≥0,8 mm n ≥ 1	
NHXCH FE180/E90 0,6/1kV	NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]		Cable ladder STL 60.403. Consoles HU 5050, bracket KTAG 400, spacers HDS 5050, threaded rod M12 and suspension hanger DBG 12. Consoles in spacing of 1500 mm. Maximum loading 20kg.m ⁻¹ . Suspended installation. Non-standard tracks: No. 5 – 7 [1]	E 90	n x ≥1,5 mm ² n ≥ 1
	NHXCH FE180/E90 4x50RM/25 0,6/1kV [1]			E 90	E 90
(N)HXH FE180/E90 0,6/1kV	(N)HXH FE180/E90 4x1,5RE 0,6/1kV [1]	E 30		n x ≥1,5 mm ² n ≥ 1	
	(N)HXH FE180/E90 4x50RM 0,6/1kV [1]	E 90		E 30	
(N)HXCH FE180/E90 0,6/1kV	(N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]	E 90		n x ≥1,5 mm ² n ≥ 1	
	(N)HXCH FE180/E90 4x50RM/25 0,6/1kV [1]	E 90		E 90	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [1]	E 90		n x ≥1,0 mm ² n ≥ 2	
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [1]	E 90		n x 2 x ≥0,8 mm n ≥ 1	
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [1]	E 30		n x 2 x ≥0,8 mm n ≥ 1	

1) Supporting construction is made of segments of steel sheets 1,2 mm thick bent to wave 550 mm long. Individual segments are fixed to ceiling by 4 pcs of anchors in spacing of 1500 mm.



Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections)	Classification for cable	
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Cable tray RL 110.400. Consoles HU 5050, brackets KTA 600, spacer HDS 5050, threaded fixing device RGAB (fixed to outside edge of cable tray) and threaded rod M10. Consoles in spacing of 1500 mm. Maximum loading 20kg.m ⁻¹ . Suspended installation. Non-standard track: No. 3 [2]	E 30	n x ≥1,5 mm ² n ≥ 1	
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		E 90	E 30	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		E 30	n x ≥1,0 mm ² n ≥ 2	
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]		E 60	n x ≥1,0 mm ² n ≥ 2	
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]		Cable ladder STL 60.403. Consoles HU 5050, bracket KTAG 400, spacers HDS 5050, threaded rod M10. Consoles in spacing of 1500 mm. Maximum loading 20kg.m ⁻¹ . Suspended installation. Non-standard tracks: No. 4 – 5 [2]	E 90	n x ≥1,5 mm ² n ≥ 1
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]			E 90	E 90
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]	E 90		n x ≥1,5 mm ² n ≥ 1	
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]	E 60		E 60	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]	E 60		n x ≥1,0 mm ² n ≥ 2	
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]	E 90		n x ≥1,0 mm ² n ≥ 2	
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]	E 90		n x 2 x ≥0,8 mm n ≥ 1	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]	Cable tray RL 110.400. Consoles HU 5050, bracket KTAG 400, spacers HDS 5050, threaded rod M10. Consoles in spacing of 1500 mm. Maximum loading 20kg.m ⁻¹ . Suspended installation. Non-standard track: No. 6 [2]		E 60	n x ≥1,5 mm ² n ≥ 1
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]			E 90	E 60
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [2]			E 30	n x 2 x ≥0,8 mm n ≥ 1
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		E 30	n x 2 x ≥0,8 mm n ≥ 1	
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]		Cable tray RLVC 60.300. Consoles TAH-D 300/500. Consoles in spacing of 1500 mm. Maximum loading 15kg.m ⁻¹ . Suspended installation. Non-standard track: No. 7 [2]	E 90	n x ≥1,5 mm ² n ≥ 1
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]			E 90	E 90
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]			E 30	n x ≥1,0 mm ² n ≥ 2
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]			E 90	n x ≥1,0 mm ² n ≥ 2



Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections)	Classification for cable	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]	Cable tray RLVC 60.300. Consoles TAH-D 300/500. Consoles in spacing of 1500 mm. Maximum loading 15kg.m ⁻¹ . Suspended installation. Non-standard track: No. 8 [2]	E 90	n x ≥1,5 mm ² n ≥ 1	
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		E 90	E 90	
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [2]		E 90	n x 2 x ≥0,8 mm n ≥ 1 E 90	
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		E 90	n x 2 x ≥0,8 mm n ≥ 1 E 90	
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]		Cable mesh tray MTC 54.400. Consoles combined of C-profile 2987 and threaded rods M10. Consoles suspended to supporting construction ¹⁾ by trapezoidal hangers DBT40 and threaded rods M8. Consoles in spacing of 1500 mm. Maximum loading 15kg.m ⁻¹ . Suspended installation. Non-standard tracks: No. 9 and 10 [2]	E 90	n x ≥1,5 mm ² n ≥ 1
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]			E 90	E 90
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]			E 90	n x ≥1,5 mm ² n ≥ 1
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]			E 90	E 90
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]			E 90	n x ≥1,0 mm ² n ≥ 2 E 90
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]			E 90	n x 2 x ≥0,8 mm n ≥ 1 E 90
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Cable tray RLVC 60.400. Consoles combined of C-profile 2987 and threaded rods M10. Consoles suspended to supporting construction ¹⁾ by trapezoidal hangers DBT40 and threaded rods M8. Consoles in spacing of 1500 mm. Maximum loading 20kg.m ⁻¹ . Suspended installation. Non-standard tracks: No. 12 and 13 [2]		E 90	n x ≥1,5 mm ² n ≥ 1
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]			E 90	E 90
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]			E 90	n x ≥1,5 mm ² n ≥ 1
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]			E 90	E 90
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		E 60	n x ≥1,0 mm ² n ≥ 2 E 60	
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]		E 90	n x ≥1,0 mm ² n ≥ 2 E 90	
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [2]		E 90	n x 2 x ≥0,8 mm n ≥ 1 E 90	
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		E 90	n x 2 x ≥0,8 mm n ≥ 1 E 90	

1) Supporting construction is made of segments of steel sheets 1,2 mm thick bent to wave 550 mm long. Individual segments are fixed to ceiling by 4 pcs of anchors in spacing of 1500 mm.



Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections)	Classification for cable	
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Cable tray RL 110.400. Consoles combined of C-profile 2987 and threaded rods M10. Consoles in spacing of 1500 mm. Maximum loading 20kg.m ⁻¹ . Suspended installation. Non-standard tracks: No. 11 and 13 [2]	E 30	n x ≥1,5 mm ² n ≥ 1	
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		E 90	E 30	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]		E 90	n x ≥1,5 mm ² n ≥ 1	
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		E 90	E 90	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		E 90	n x ≥1,0 mm ² n ≥ 2	
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]		E 90	n x ≥1,0 mm ² n ≥ 2	
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [2]		E 90	n x 2 x ≥0,8 mm n ≥ 1	
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]		E 90	n x 2 x ≥0,8 mm n ≥ 1	
NHXH FE180/E90 0,6/1kV	NHXH FE180/E90 4x1,5RE 0,6/1kV [1]		Track is made of C-profiles 2970 fixed to ceiling in spacing of 600 mm. Cables are fixed to profiles by cable yoke clamps type "B". Non-standard tracks: No. 12 – 14 [1]	E 90	n x ≥1,5 mm ² n ≥ 1
	NHXH FE180/E90 4x50RM 0,6/1kV [1]			E 90	E 90
NHXCH FE180/E90 0,6/1kV	NHXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]			E 90	n x ≥1,5 mm ² n ≥ 1
	NHXCH FE180/E90 4x50RM/25 0,6/1kV [1]			E 90	E 90
(N)HXH FE180/E90 0,6/1kV	(N)HXH FE180/E90 4x1,5RE 0,6/1kV [1]	E 60		n x ≥1,5 mm ² n ≥ 1	
	(N)HXH FE180/E90 4x50RM 0,6/1kV [1]	E 30		E 30	
(N)HXCH FE180/E90 0,6/1kV	(N)HXCH FE180/E90 4x1,5RE/1,5 0,6/1kV [1]	E 60		n x ≥1,5 mm ² n ≥ 1	
	(N)HXCH FE180/E90 4x50RM/25 0,6/1kV [1]	E 60		E 60	
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [1]	E 90		n x ≥1,0 mm ² n ≥ 2	
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [1]	E 90		n x 2 x ≥0,8 mm n ≥ 1	
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [1]	E 90		n x 2 x ≥0,8 mm n ≥ 1	



Cable	Type of tested cable, single cross-sections and number of conductors	Arrangement	Classification for type of tested cable (by cross-sections)	Classification for cable	
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]	Track is made of C-profiles 2970 fixed to ceiling in spacing of 600 mm. Cables are fixed to profiles by cable yoke clamps type "B". Non-standard track: No. 15 [2]	E 90	$n \times \geq 1,5 \text{ mm}^2$ $n \geq 1$	
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]		E 90	E 90	
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]		E 90	$n \times \geq 1,5 \text{ mm}^2$ $n \geq 1$	
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]		E 90	E 90	
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]		E 90	$n \times \geq 1,0 \text{ mm}^2$ $n \geq 2$	
BiTflame® 1000 FE180/PH90 E90 0,6/1kV	BiTflame® 1000 FE180/PH90/E90 4x1,5RE 0,6/1kV [2]		Track is made of C-profiles 2970 fixed to ceiling in spacing of 600 mm. Cables are fixed to profiles by cable clips SAS. Non-standard track: No. 16 [2]	E 90	$n \times \geq 1,5 \text{ mm}^2$ $n \geq 1$
	BiTflame® 1000 FE180/PH90/E90 4x50RM 0,6/1kV [2]			E 90	E 90
BiTflame® 1000 C FE180/PH90 E90 0,6/1kV	BiTflame® 1000C FE180/PH90/E90 4x1,5RE/1,5 0,6/1kV [2]			E 90	$n \times \geq 1,5 \text{ mm}^2$ $n \geq 1$
	BiTflame® 1000C FE180/PH90/E90 4x50RM/25 0,6/1kV [2]			E 90	E 90
HDGs FE180 PH90/E90 300/500V	HDGs 2x1,0 FE180 PH90/E90 300/500V [2]			E 90	$n \times \geq 1,0 \text{ mm}^2$ $n \geq 2$
HDGsekwf FE180 PH90/E90 300/500V	HDGsekwf 2x1,0 FE180 PH90/E90 300/500V [2]	E 90		$n \times \geq 1,0 \text{ mm}^2$ $n \geq 2$	
HTKSH FE180 PH90/E90 225V	HTKSH 1x2x0,8 FE180 PH90/E90 225V [2]	E 90		$n \times 2 \times \geq 0,8 \text{ mm}$ $n \geq 1$	
HTKSHekw FE180 PH90/E90 225V	HTKSHekw 1x2x0,8 FE180 PH90/E90 225V [2]	E 90		$n \times 2 \times \geq 0,8 \text{ mm}$ $n \geq 1$	

The element, Cable supporting system NIEDAX with power and communication halogen-free cables Bitner with circuit integrity maintenance classes are classified to classes according to achieved test results of tested cables at tracks. Another classification is not allowed.

4.2 FIELD OF APPLICATION

This classification is valid for the following end use applications:

- throughout the period during which circuit integrity is to be maintained, neighboring building components shall not have a negative effect on circuit integrity;
- although testing is only carried out on cables arranged horizontally, test results also apply to cables arranged either diagonally or vertically (e.g. in risers), as long as the cable system is supported in transitional areas (i.e. where it switches from a horizontal to a vertical arrangement) in such a manner that the cables will not slip or kink at corners;
- test results of function in fire test of cables tested at standard supporting construction are also applicable for tested standard supporting construction of other producers;
- test results of function in fire test of cables tested at standard supporting construction are also applicable for cables of other producers tested at standard supporting construction;
- where risers are used, circuit integrity classification only applies if the cable is effectively supported (i.e. with a spacing of supports of 3 500 mm or less and the distance between cable clips is ≤ 300 mm). Figure 5 of standard DIN 4102-12 shows a suitable means of mounting cables on risers. Cables may also be stabilized by a seal at penetrations in floors, provided that the sealant material is of a suitable material class, or using clips of proven suitability. The suitability of any design other than that shown in figure 5 may only be assessed by an accredited test laboratory;



- for vertical systems, the test results obtained for cables mounted singly on the ceiling using single clips apply. Brackets of proven suitability may also be used, as long as their spacing is equal to that of the single clips tested;
- test results of testing single cables on the ceiling apply also to cables mounted horizontally on walls;
- test results of testing bunched cables on a ladder or tray also apply to support construction attached to a wall. However, such constructions required proof of suitability by means of a test certificate or other document issued by an accredited testing laboratory.

4.3 FIELD OF APPLICATION BEYOND THE APPLICATION DEFINED IN STANDARD

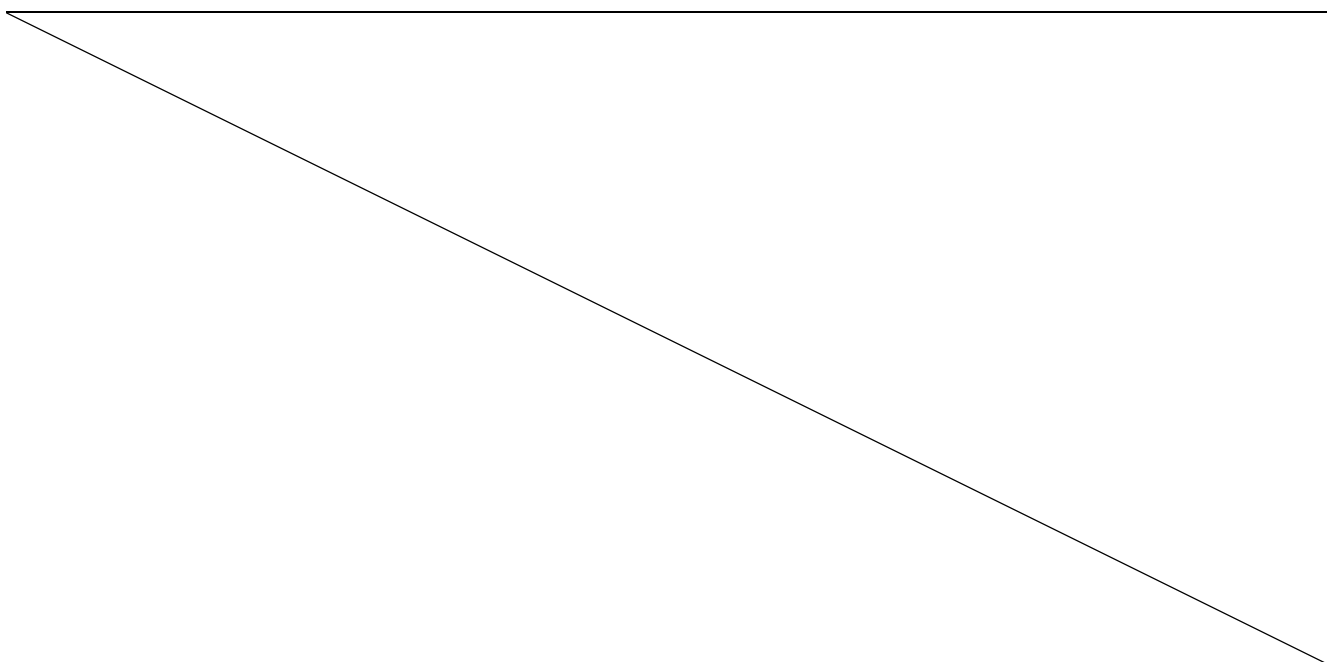
- classification for type of tested cable (by cross-sections of conductors) is valid only for tested cable types and cross-sections of conductors;
- classification for type of cable is valid for all numbers and cross-sections of tested cable type;
- test results of cable systems placed on a non-standard support structures are directly applied only to the tested cable systems;
- test results of cables tested at cable trays or ladders are applicable also for another products trays and ladders (cross, elbow, T-bend, bends and etc.);
- direct application of test results is possible also to other methods of joining of cable trays and cable ladders than shown of DIN 4102-12 provided they are assessed by an accredited testing laboratory;
- test result obtained from testing of cables with five or four conductors applies also to cables of the same type with smaller or greater number of conductors;
- test results obtained for cable system with cable trays are directly applicable also for usage of cable trays coverings; the coverings shall be ensured against movement with a proper manner. The weight of the cover must be added to the total load.
- test results obtained for products used for connection of cables may be directly applied also to an application with cable products from another manufacturer which were tested following this standard and that constructional realisation was assessed by an approved testing laboratory;
- test results of electrical installation boxes with five terminals can be directly applied to a smaller number of terminals.

4.4 LABELING OF CABLE TRACK

Contractor marks cable system by attachment of label which must contain the following informations:

- name of responsible person, who installed the system;
- name of cable system as it is stated in this judgement;
- class of circuit integrity maintenance and classification report number;
- real value of mechanical loading of cable system by cables
- date of assembly of cable system.

If the track is long, it is appropriate to repeat the labeling approximately every 50 m.





5. LIMITATIONS

Load-bearing construction elements for fixing of cable systems must be proved for at least the same fire resistance compare to classified function in fire of cable system.
The construction contractor is solely responsible for proper preparation.

This classification document does not represent type approval or certification of the product.

The classification is valid provided that the product, field of application and standards and regulations are not changed.

Approved by:

Ing. Marek Gorlický
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Prepared by:

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